TRANSLATION

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ABSTRACT

The subject color printing system shows a temperature-controlled counter-pressure cylinder (1) having a film web (2) or paper web to be printed running therearound, said cylinder having a plurality of inking assemblies (3) associated therewith each followed in the direction (A) of web movement by ink drying means (7).

Each said drying means includes a drying box (8) extending along the length of the counter-pressure cylinder and having therein blow nozzles connected with blower air supply means and discharge suction ducts connected with blower air return means.

DESCRIPTION

The invention relates to a color printing system or print stand including a temperature-controlled counter-pressure cylinder having running therearound film webs or other materials to be printed, and a plurality of inking assemblies each followed in the direction of film movement by ink drying means, said ink drying means each including a drying box extending along the width (length) of the counter-pressure cylinder and having therein blow nozzles connected with a blower air supply port and suction ducts connected with an air return port.

In color printing systems of this nature, the concentration of heat at the drying stations following the inking stations presents problems in that the said drying stations are not insulated thermally and undesirably emit heat to the outside and to subsequent ink applying stations, which may result in printer mal-

function in operation; the ink applying stations should not be subjected to thermal influence as the heat may solidify the ink to be applied and thus would preclude unobjectionable printing runs.

In the absence of the former heating influence of the various drying temperatures, the effects thereof on the anilox roller, the printing cylinder with the plates thereon and the lateral frame members would be completely eliminated. Also, such absence would result in a more precise initial adjustment if the inking units, which would not require frequent re-adjustment, and in an enhanced print quality.

Outwardly directed thermal radiation causes gases to be released from the inks which are annoying to the operating personnel and damaging the environment.

For these reasons, it is necessary to provide for a safe supply of heat to and shielding thereof at the sites specified; this has never been accomplished conventionally even where sophisticated means and procedures were used.

It is the object of the invention to provide a color printing system constructed as initially set forth of which the ink drying means are thermally insulated from the environment in a simple, cost-saving and safe manner and in which the heated drying air is supplied in a well-aimed manner to the treating site in the shielded area.

In accordance with the invention, this object is attained by the characterizing features of patent claim 1, with the configuration features in the various dependent claims constituting advantageous further developments of the aforesaid solution of the underlying problem.

The invention provides ink drying means including a drying box adapted to outwardly and thermally insulatedly discharge the warm air for drying the ink applied to the film web and to do so in a well-directed as well as simple, cost-saving and safe manner without affecting the external portions of the printing system in any way.

The drying box is provided with/formed of a thermally insulated material and/or equipped with a reflecting mirror having a focus-like configuration, a focus of flexibly selectable degrees or a vacuum body (like a thermos flask, for example). The mirror and the insulating body may be designed to form a focus-like dual-wall vacuum element of a metal or a plastics material so that these thermal insulating and retaining means cause the heat to be concentrated in the drying box and thus within the drying area, whereby the exterior thereof will not be affected by the heated air.

These measures cooperate to dry the printed film web in an optimum manner and without functionally impairing the subsequent inking mechanisms (immersion roller, anilox roller, doctor blade fountain, pressure cylinder and printing plates).

In addition, thermal radiation outwards to the inking mechanisms is prevented so that no gases will be released from the inks in the inking units, whereby work sites will be more environmentally friendly and more pleasant to the operating personnel.

The drawings depict variations of an embodiment example of the invention, which will be explained in detail below.

Fig. 1 schematically shows a printing stand including a counter-pressure cylinder having a film web running therearound, inking units associated therewith and ink drying means associated with the inking units;
Fig. 2 shows a sectional view taken through an ink drying assembly including a drying box as well as blow nozzles and suction ducts therein;
Fig. 3 to Fig. 7 show sectional views taken through wall portions of the drying box with various kinds of thermal insulation;
Fig. 8 shows a sectional view taken through a drying box configured in departure from Fig. 2.

There is generally shown at (1) a temperature-controlled counter-pressure cylinder included in a printing stand or an inking assembly, said cylinder having running therearound a plastic film web (2) or paper web to be printed.

Counter-pressure cylinder (1) has arranged therearound a plurality of inking units (3) each including an ink box with ink supply nips (4), an immersion roller (supply roller) (5) disposed therein and an anilox roller (metering roller) (5a) - or, alternatively, simply an anilox roller and a doctor blade - as well as an exposed print cylinder (6) cooperating with film web (2).

Each inking unit (3) is followed in the direction "A" of film web movement by ink drying means (7) including an ink drying box (8) extending along the length of counter-pressure cylinder (1) and having therein blow nozzles (10) connected with a blower air supply port (9) and a suction channel (12) connected with a vacuum-type air return port (11).

Drying box (8) is formed to be a chamber profiled to expand towards counter-pressure cylinder and having roller-side edges (8a) engaging film web (2) sub-

stantially without leaving a gap therebetween to allow as little air as possible - or no air at all - to escape from drying box (8).

Drying box (8) has therein two air chambers (13, 14) a blower-side one of which (13) is connected with blower air supply port (blower air line connector) (9) and supports blow nozzles (10) extending therefrom towards counter-pressure cylinder (1); the suction-side other one (14) is connected with the vacuum return duct (11) to cooperate with drying box (8) to form the suction side.

Blow nozzles (10) serve to blow hot air having a temperature of approx. 60 deg. to 80 deg. into drying box (8) where a swirling movement is imparted thereto and it is moved against the moving film web (2) in order to dry the ink; thereafter, it flows back laterally over nozzles (10) and is withdrawn through vacuum duct (12).

Counter-pressure cylinder (1) is maintained at a temperature of about 30 deg., which is considered a cooling temperature relative to the hot air used for drying the ink.

In order to utilize the hot air for drying the ink and to not allow it to carry heat from drying box (8) outwardly into the environment and, especially, into the adjacent inking units (3), the inside and outside surfaces (15, 16) of drying box (8) are designed to be thermally insulating relative to each other.

Such thermal insulation of the drying box walls may be configured in a variety of ways, that is:

1. Drying box wall (17), which is metal or the like, has one or several layers of insulation (18) applied to the outside surface thereof (Fig. 3).

2. Drying box wall (17), which is metal or the like, has one or several layers of insulation (18) applied to the inside surface thereof (Fig. 4).
3. Drying box wall (17) has a mirror (reflecting coat) (19) applied to the inside or outside surface thereof (Fig. 5).
4. The drying box wall itself is formed of a single- or multi-layered insulating wall (20) (Fig. 6).
5. The drying box wall itself is formed of a single- or multi-layered insulating wall (20) and a reflector (19) on the inner or outer surface thereof (Fig. 7).
6. Drying box wall (17) has a reflector (19) on one of the inner and outer sides thereof and a single- or multi-layered insulation (18) on the respective other side.
7. Drying box wall (17) is designed to form a hollow wall having a vacuum inside it like the walls of a thermos flask, whereby wall (17) constitutes a dual-wall vacuum element.
8. Drying box (8) has a reflecting mirror in a focus-like arrangement disposed therein, with the focus degrees being flexible or variable.
9. The reflector and the insulating walls of drying box (8) can be made of a metal and/or plastics material to form a dual-wall vacuum element.

The thermal insulation of drying box (8) is provided in its entire inner and/or outer areas, so that drying box (8) thermally surrounds air chambers (13, 14) as well.

The insulating material may be any material having thermally insulating properties, including foamed or fibrous plastics of any kind and composition, glass wool, mineral wool, glass and mineral foam, carbon fiber products, organic products and natural insulating materials such as cotton, hair, felt.

The outer shape of drying box (8) may vary or may be selected to conform with existing space constraints, resp.

PATENT CLAIMS

1. Color printing system including a temperature-controlled counter-pressure cylinder having running thereabout a film web to be printed, as well as a plurality of inking units disposed circumferentially of the counter-pressure cylinder and each followed in the direction of film web movement by ink drying means including a drying box extending along the length of the counter-pressure cylinder and having therein blow nozzles connected with a blower air inlet port and suction channels connected with a blower air return port, **characterized** in that the inside and outside surfaces (15, 16) of drying box (8) are thermally insulated from each other.

2. Color printing system as in claim 1, characterized by drying box (8) having a single- or multi-layered insulation (18) on the outer surface of its wall (17).

3. Color printing system as in claim 1, characterized by drying box (8) having a single- or multi-layered insulation (18) on the inner surface of its wall (17).

4. Color printing system as in claim 1, characterized by drying box (8) having a reflector (19) on the inside or outside surface of its wall (17).

5. Color printing system as in claim 1, characterized by the wall of drying box (8) being formed of a single- or multi-layered insulation (20).

6. Color printing system as in claim 1, characterized by the wall of drying box (8) being formed of a single- or multi-layered insulation (20) and a reflector (19) on the inside or outside surface.

7. Color printing system as in claim 1, characterized by wall (17) of drying box (8) having a reflector (19) on one side thereof and a single- or multi-layered insulation (18) on the other side thereof.

8. Color printing system as in claim 1, characterized by the wall of drying box (8) being formed of a dual-wall vacuum element.

9. Color printing system as in claim 1, characterized by drying box (8) having provided therein a reflecting mirror (21) in a focus-like arrangement.

10. Color printing system as in one or more of claims 1 to 9, characterized by said thermal insulation of drying box (8) being provided on the entirety of its inside and/or outside surfaces.

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